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On a new genus and species and on some described armoured scale insects (Homoptera: Diaspididae) mainly from southern Africa

by

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The new species *Eremiaspis graminis*, which is the second in the genus, is described from South West Africa. The new genus *Phaspis* is established for the new species *P. lobulata*, which is described from the Transvaal. The cotypes of *Aonidia glandulosa* Newstead, the type-species of *Pseudotargionia* Lindinger, were studied and the lectotype has been selected. The identification of *P. glandulosa* from southern Africa is confirmed, and notes are presented on the variation in some features of this species. The description is given of *Pseudotargionia anareolae* spec. nov. from the Transvaal, bringing to five the total number of the African species that are included in the genus, and a key is presented for the separation of the latter species.

This paper presents the descriptions of some new taxa of armoured scale insects (Homoptera: Diaspididae) from southern Africa. Two of these are new species which have been collected from the twigs of *Acacia nigrescens* in the Transvaal. It was found that one of the latter represents an undescribed genus of the Melanaspidina, and for it the new genus *Phaspis* is here established. The other one proved to be the fifth African species of *Pseudotargionia* Lindinger. The study of the new species of *Pseudotargionia* necessitated re-examination of the type-series of *Aonidia glandulosa* Newstead, 1911 (the type-species of *Pseudotargionia* Lindinger) and comparison of it with samples of *P. glandulosa* from southern Africa and from other territories.

The fourth taxon to be described here is a new species of *Eremiaspis* Balachowsky. Hitherto this genus was known only from its type-species which has been recorded so far only from northern Africa.

EREMIASPIS Balachowsky, 1951

Eremiaspis Balachowsky, 1951: 671. Type-species: *Hemiberlesia balachowskyi* Rungs, 1936: 53.

Balachowsky (1951) introduced this genus and assigned it to the Targionina. The type-species was described from Morocco where it was found to infest *Farsetia hamiltonii* (Cruciferae). The second included species, described here, is from South West Africa.

Eremiaspis graminis spec. nov., fig. 1

Female scale white, rounded in outline (1,0–1,5 mm in diameter), flat; with a well developed ventral velum, white in colour; larval exuviae brown, placed centrally.

Male scale not seen.

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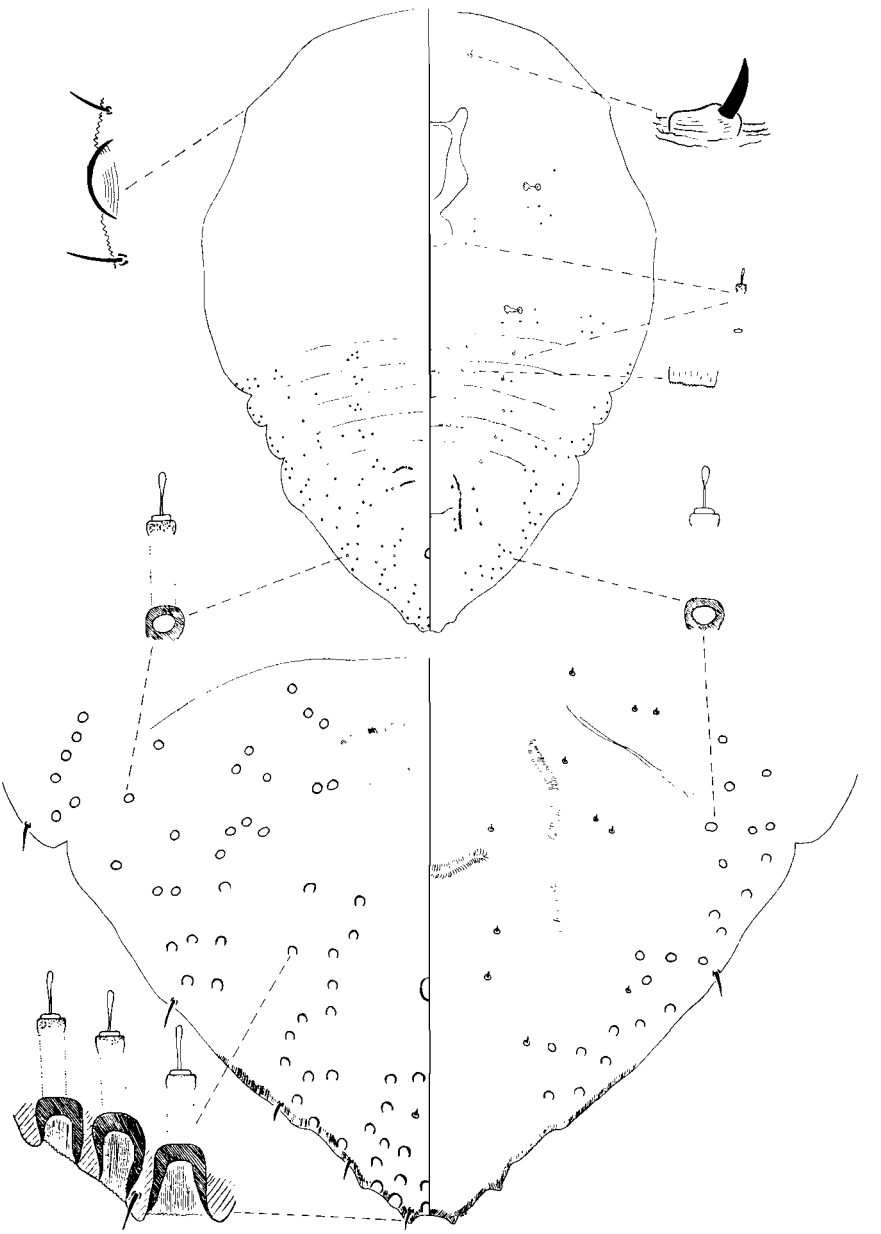

Fig. 1. *Eremiaspis graminis* spec. nov.

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Mounted females oval in outline, rounded anteriorly and pointed at the pygidial apex; about 0,7 mm long, 0,5 mm wide; young and fully grown, reproducing female—membranous. With two pairs of pygidial lobes represented by small projections from the margin; median lobes well separated by an interval into which opens one marginal macroduct. Plates absent. Ducts all of similar shape, each with a ductule, about half the length of the duct, extending from the inner end; their size decreases from the pygidium (about 12 $\mu \times 3 \mu$) to the thorax (about 7 $\mu \times 1 \mu$). Dorsal ducts are all of the larger size, distributed on the pygidium and as far forward as first abdominal segment; they are absent from the median areas of segments I to V; each duct with a sclerotized rim. Ventral macroducts, each with a sclerotized rim, occur marginally and submarginally from segment VI to I. Microducts, without a sclerotized rim, occur only ventrally as follows: submedially on segments I to IV, near the posterior spiracle and laterally to it, on each side of the mouth parts, and near the anterior spicacle. Thoracic tubercle present as a slightly sclerotized boss at the level of the anterior margin of the mouth parts. Interval between the interlobular margin of the median lobes and the vulva about twice that between the anal opening and the above-mentioned margin. Anal opening rounded, about 7 μ in diameter. Perivulvar pores absent. With a well developed paravulvar sclerosis. Anterior and posterior spiracles without parastigmatic pores. Antennal tubercle with one hair.

MATERIAL EXAMINED. SOUTH WEST AFRICA, 30 km north of Noordoewer, 27.IX. 1973, on *Aristida* cf. *brevifolia* (Gramineae), Y. Ben-Dov, HC 5779. Described from a female holotype (HC 5779/1) and 23 paratypes.

NOTES. This new species differs from the type-species by the absence of plates, and by the smaller size of the anal opening the diameter of which is about half that of *E. balachowskyi*.

PHASPIS gen. nov.

Type-species: *Phaspis lobulata* spec. nov.

Diaspididae referable to the subtribe Melanaspidina (*sensu* Borchsenius) of the Aspidiotini. Pygidium of the female with only two paraphyses present on each side; one paraphysis arises from the inner basal angle of the second lobe, and the second from the same angle of the third lobe. With three pairs of pygidial lobes, all of which are wider than long. With simple plates present in all the interlobular spaces and anteriorly to the third lobe as far forward as the fourth segment. Margin of prepygidial segments of abdomen and of meta- and of mesothorax with deep emarginations that are associated with microducts. Dorsal macroducts of one size, and their length exceeding the interval between the vulva and the bases of the median lobes. With a thoracic boss. Anterior and posterior spiracles without parastigmatic pores. Antennal tubercle with one hair.

First instar larvae with a five-segmented antennae; the terminal segment annulate, and longer than the total length of the four preceding ones.

This new genus differs from *Melanaspis* Cockerell by possessing only two pairs of pygidial paraphyses. The presence of dorsal macroducts that are of one size distinguishes *Phaspis* from *Lindingaspis* MacGillivray. From *Clavaspis* MacGillivray it differs by the presence of three pairs of pygidial lobes, and from *Diclavaspis* Balachowsky by the elongate shape of the paraphyses and their absence between the median lobes.

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It resembles *Pseudomelanaspis* Borchsenius by the presence of only two pairs of pygidial paraphyses, but differs by the squat lobes, the presence of plates anteriorly to the third lobe and the very small number of dorsal macroducts that occur marginally and submarginally only between the median and second lobes and between the second and third ones. *Phaspis* differs from *Greenoidea* MacGillivray, as resurrected and redescribed by Gerson & Davidson (1974), by the presence of only two pairs of pygidial paraphyses and the absence of the latter in the median position. The absence of median paraphyses, the squat shape of the pygidial lobes and the deeply emarginated margin of the prepygidial segments and of the thorax are the characters distinguishing *Phaspis* from the newly described genus *Avidovaspis* Gerson & Davisdon, 1974.

Phaspis lobulata spec. nov., fig. 2

Female scale oval in outline about 1,5 mm long, 1,0 mm wide; colour black with a bright brown margin; larval exuviae central; without a ventral velum, other than a thin layer of white wax that is attached to the host plant.

Male scale not seen.

Mounted female circular, 0,5–0,8 mm in diameter; third abdominal segment represented laterally by a conspicuous lobe on each side, that is bordered anteriorly and posteriorly by deep constrictions; body of young female—and that of a reproducing one—membranous. Three pairs of pygidial lobes present. Median lobes separated by an interlobular space that is as wide as the length of the inner margin of the median lobe; each lobe about three times as wide as long, with the apical margin obliquely sloping and slightly serrated close to the outer margin. Second lobes triangular in shape, with a rounded apex, outer margin longer than the inner one. Third lobes short and wide, about as wide as the median ones; each lobe with a deep, rounded emargination at the apical margin. Plates, all of them simple, present as follows: two between the median lobes, about as long as the latter; two between the median and the second lobes, longer than the median plates and the median lobes; two between second and third lobes; a pair of plates anteriorly to the third lobe; one or two plates anteriorly to the seta marking the fourth segment; from the base of each plate extends a narrow duct that is slightly shorter than the distance between the vulva and the base of the median lobes. Dorsal macroducts open marginally and submarginally as follows: two between the median and second lobes; two or three between the second and third lobes; the length of each duct is 1,25–1,5 times the distance between the vulva and the base of the median lobes; the diameter of the inner extremity of the macroduct is about twice that of the plate's duct. Marginal microducts, the diameter of their inner extremity is subequal to that of the plate's duct but they are shorter than the latter; they occur from segment III to the level of the thoracic boss, and following a short interval they are placed up to the level of the antennal tubercle; the ducts along the margin from segment II to the thoracic boss discharge into deep, lateral emarginations in the margin. With only two paraphyses on each side of the pygidium; one arising from the inner basal angle of the second lobe, its length about half the distance between the anal opening and the base of the median lobes; the second extends from the inner basal angle of the third lobe, and it is slightly shorter than the first paraphysis. A marginal boss occurs at the level of the anterior spiracle. Interval between the vulva and the base of the median lobes about twice that between the anal opening and the base of median lobes. Perivulvar pores absent. Anterior and posterior spiracles without parastigmatic pores. Antennal tubercle with one hair.

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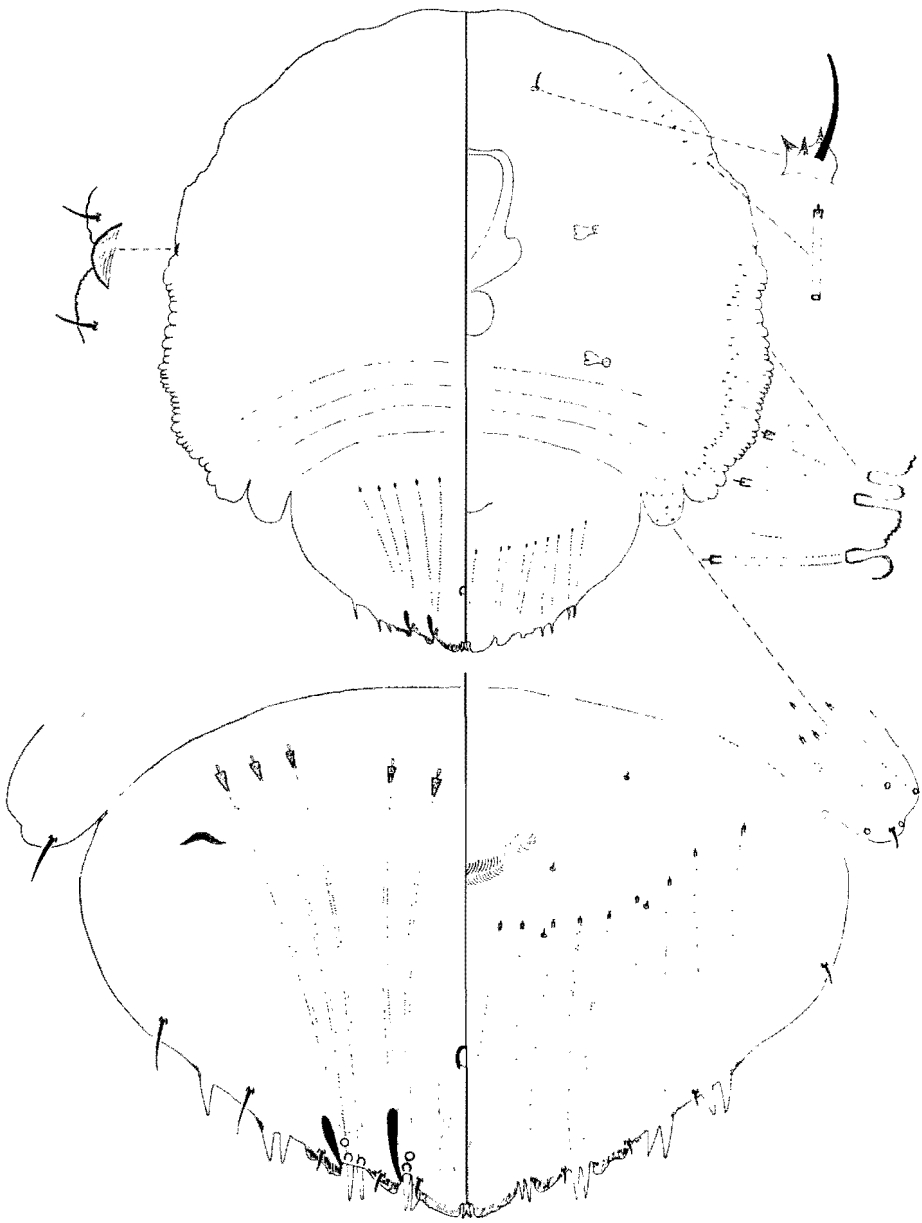

Fig. 2. *Phaspis lobulata* gen. et spec. nov.

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MATERIAL EXAMINED. SOUTH AFRICA, Transvaal, Phalaborwa, 15.VI.1972, on *Acacia nigrescens*, Y. Ben-Dov, HC 5835. Described from a female holotype (HC 5835/2) and 13 paratypes. All the type-series specimens were taken from twigs.

PSEUDOTARGIONIA Lindinger, 1912

Pseudotargionia Lindinger, 1912: 50. Type-species: *Aonidia glandulosa* Newstead, 1911: 102.

Until the end of the 1960's this genus was known to be represented in Africa only by its type-species (see Balachowsky, 1958). In recent years, three new species have been added to the genus (Munting, 1969; Ben-Dov, 1972) all of them from southern Africa. A fifth African species, which has been recently collected in the Transvaal, is described here.

Pseudotargionia anareolae spec. nov., fig. 3

Female scale oval in outline, about 1,2 mm long, 0,9 mm wide; greyish white in colour, larval exuviae brown, placed at the anterior apex.

Male not seen.

General outline of mounted female almost circular; young female 0,6 mm long, 0,5 mm wide, fully grown, reproducing female 0,8 mm long, 0,7 mm wide; thoracic constriction obsolete. Young female membranous; entire body of fully grown, reproducing female sclerotized, without thoracic areolae. Three pairs of pygidial lobes present; median lobes prominent, with a pre-apical notch on the outer margin; second lobes, about half the size of the median ones, each with an apical notch; third lobes triangular in shape. Two plates present in each of the median, first and second interlobular spaces; into the apex of each plate discharges a long microduct that extends slightly more than halfway to the vulva. Dorsal macroducts with their diameter greater than that of the ventral ones; their length about two thirds of the distance between the anal openings and the bases of the median lobes; from the inner end of each duct (on segments VIII-III) extends a ductule that is about as long as the duct; the distribution of the dorsal macroducts is as follows: one between the median lobes, first row (between median and second lobes) with 3–4 ducts, second row—4–6, third row—6–13, fourth row—5–10, fifth row (segment IV)—2–6, on segments III and II they are placed in groups occupying the marginal and submarginal areas. Ventral microducts distributed as figured on pygidial segments, and as high as the mesothorax; those on abdominal segments are with a sclerotized rim, whereas those on the thorax are without. With two marginal paraphyses, subequal in size, between median and second lobes, and two marginal ones, smaller than the former, between second and third lobes. A ventral boss occurs submarginally on each side of the mesothorax. Ventral crenulae* are placed in transverse rows on the median and submedian areas of segments I–VI. Interval between the median lobes base and vulva 2–3 times that between anal opening and base of median lobes. Anal opening triangular and elongate in shape, surrounded by a sclerotized rim; its length about half that of a median lobe. Perivulvar pores absent. Anterior spiracle with 2–6 parastigmatic pores, posterior one with none. Antennal tubercle with one hair.

* This term is used for the scale-like structures that occur ventrally on the median and submedian areas of the abdominal segments of various species in different genera. They occur in *P. anareolae* and in other species of *Pseudotargionia*. They are very conspicuous in species of *Odonaspis* Leonardi.

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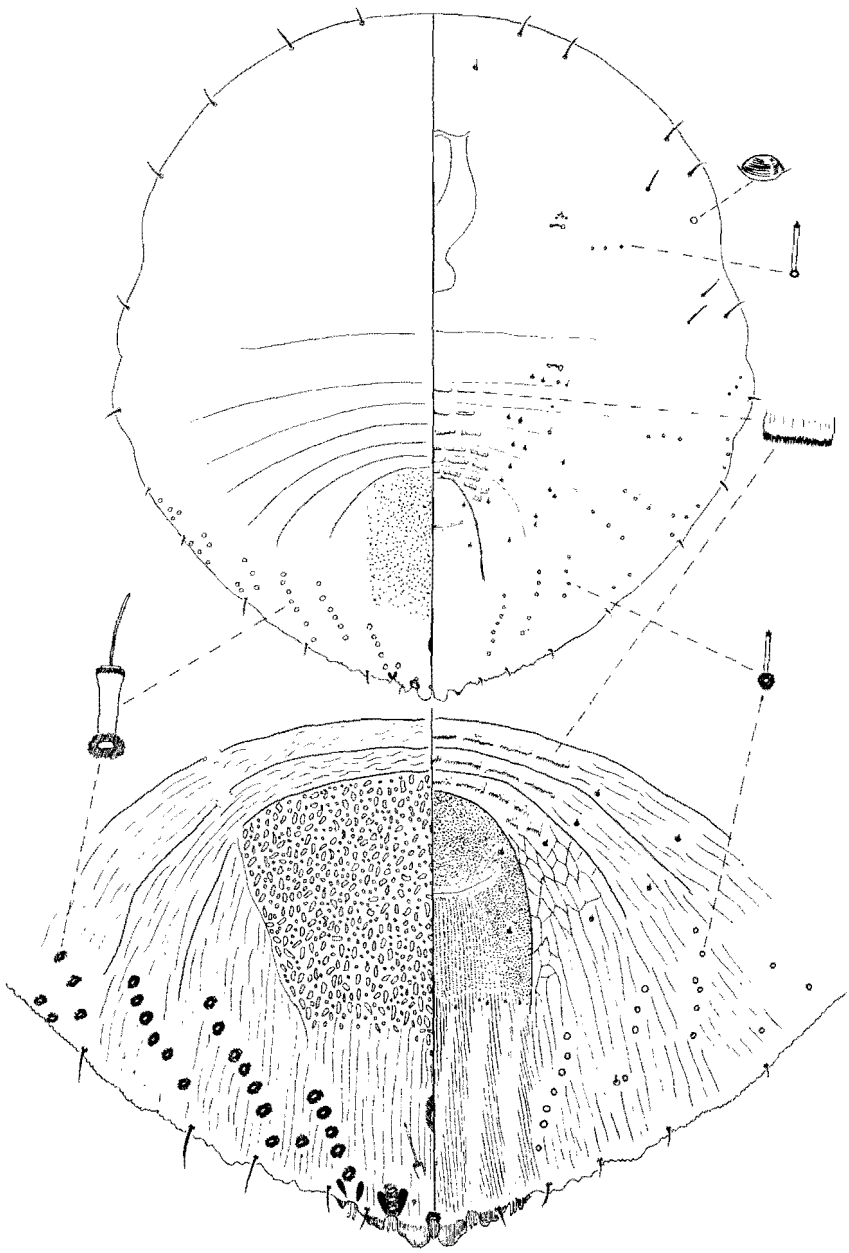

Fig. 3. *Pseudotargionia anareolae* spec. nov.

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MATERIAL EXAMINED. SOUTH AFRICA, Transvaal, Phalaborwa, 15.VI.-1972, on *Acacia nigrescens* (Leguminosae), Y. Ben-Dov, HC 5799. Described from the female holotype (HC 5799/3) and 24 paratypes. All the type-series specimens were taken from twigs.

NOTES. This new species differs from all other African species of *Pseudotargionia* by the interval between the anal opening and the median lobes base, which is longer than the length of the dorsal macroducts. The fully grown females differ from their African congeners by the absence of the thoracic areolae.

Pseudotargionia damara Munting

Pseudotargionia damara Munting, 1969: 136

This species is known so far only from the original description which was based on a collection taken from *Acacia hebeclada* in Daan Viljoen Game Park, South West Africa.

MATERIAL EXAMINED. SOUTH WEST AFRICA, Daan Viljoen Game Park, 26.VIII.1967, *Acacia hebeclada*, HC 2872 (Type-series).

Pseudotargionia glandulosa (Newstead)

Aonidia glandulosa Newstead, 1911: 103
Pseudotargionia glandulosa (Newstead); Balachowsky, 1951: 677
Pseudotargionia glandulosa (Newstead); Balachowsky, 1958: 276

The first report of this species in southern Africa was by Brain (1919) who recorded it from *Acacia horrida* in Stellenbosch (C.P.) and in South West Africa. Since then many more collections have been made in southern Africa (see below). A preliminary examination of the morphological features of southern African specimens of this species revealed some discrepancies between them and the redescription of *glandulosa* as presented by Balachowsky (1958). In order to confirm the identification of the species occurring in southern Africa, comparisons were made with the type-series of *Aonidia glandulosa*. In addition I have been able to examine some samples of *P. glandulosa* from territories adjacent to the type-locality (see Table 1). It was found that the southern African specimens agree with the type-series in most of the major characters, i.e. thoracic areolae, distribution of the ventral thoracic microducts, pygidial paraphyses, occurrence of dorsal submarginal boss, and the size of the dorsal macroducts. However, there are some quantitative differences in the dorsal macroducts of the third, fourth and fifth rows (on segments V, IV, III). Generally the number and especially the maximal number of the ducts in specimens from southern Africa are higher than in the type-series, and in specimens from Lybia and Sinai. In addition, each of these rows, in southern African specimens, usually extends anteriorly to the level of the vulva, whereas in the type-series specimens the rows extend slightly posteriorly to the level of the vulva. On the other hand there is a considerable variation in these numbers within the samples from southern Africa, and there is an overlap between the numbers of the dorsal macroducts in some of the southern African specimens, and between these ducts in the type-series specimens, and in the ones from Lybia and Sinai. I have also compared female second instar larvae from the northern territories with the same instar from southern Africa, and found no significant differences in their morphological characters. I conclude that the southern African material represents *P. glandulosa*.

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TABLE 1. Range of the numbers of dorsal macroducts in the third, fourth and fifth rows (segments V, IV, III) of *Pseudotargionia glandulosa* females from *Acacia* spp. in various localities.

locality	row	3	4	5
Egypt				
type-series		14–21	10–23	5–9
Faiyoum		14–24	13–22	5–8
Sinai peninsula		9–17	8–17	2–8
Lybia		15–23	15–25	5–8
South Africa				
Kenhardt		11–31	13–30	7–20
Vryburg		17–27	19–26	18–20
Messina		24–37	28–49	16–26
Swartruggens		32–45	27–58	25–36
Mafeking		28–35	38–42	23–30
Hartbeespoortdam		28–55	28–60	20–40
South West Africa				
Windhoek		18–25	20–32	13–15

MATERIAL EXAMINED. EGYPT: Two slides labelled "*Aonidia glandulosa* Newst. Cotype ♀♀, On "Sunt" *Acacia Arabica*, Upper Egypt—above Aswan. Collected by F. Hughes. July 1909. Willcock.", and mounted with 7 ♀♀ and 7 larval exuviae; one of these females has been selected and here designated Lectotype; the exuviae were remounted on two slides (all type-series in BMNH); Faiyoum, 25.IX.1906, *Acacia arabica*, W. Draper, HC 5860. SINAI PENINSULA: Wadi Feiran, 17. VII.1968, *Acacia* sp., Y. Ben-Dov, HC 5820; Sharem-el-Sheikh, 15.VII.1970, *Acacia* sp., A. Danin, HC 5821. LYBIA: Fezzan, 30 km N. de Rhat, 28.III.1949, *Acacia* sp., A. S. Balachowsky, HC 2999. SOUTH AFRICA: Transvaal: Hartebeestpoort Dam, 11.-III.1965, *Acacia tortilis* s. sp. *heterocantha*, HC 1830; Swartruggens, 6.III.1967, *Acacia* sp., HC 2708; Messina, 14.XII.1967, *Acacia* sp., HC 2990. Cape Province: Mafeking, 7.3.1967, *Acacia* sp., HC 2652; Mafeking, 7.3.1967, *Acacia tortilis* s. sp. *tortilis*, HC 2653; Vryburg, 9.3.1967, *Acacia* sp., G. De Lotto, HC 2709; Mafeking, 7.3.1967, *Acacia karoo*, J. Munting, HC 2711; Kenhardt, March 1917, *Acacia* sp., J. C. Faure, HC 3066; SOUTH WEST AFRICA: *Acacia horrida*, 1903, Cape no. 1137, C.K.B. 218/a; Windhoek, Jan. 1930, *Acacia horrida*, HC 3064; Noordoewer, 27.IX.1973, *Prosopis* sp. cf. *chilensis*, Y. Ben-Dov, HC 5798.

Pseudotargionia kalaharica Munting

Pseudotargionia kalaharica Munting, 1969: 137

All the available records of this species are of collections taken from *Acacia giraffae* in the Kalahari Gemsbok National Park (type-locality) and from Hardap Dam in South West Africa.

MATERIAL EXAMINED. SOUTH AFRICA. Cape Province: Kalahari Gemsbok National Park, Nossob, 23.VIII.1967, *Acacia giraffae*, HC 2867 (Type-series); Kalahari Gemsbok National Park, Grootkalk, 22.VIII.1967, *Acacia giraffae*, HC 3170. SOUTH WEST AFRICA. Hardap Dam, 25.VIII.1967, *Acacia giraffae*, HC 2906.

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Pseudotargionia subcorticis Ben-Dov

Pseudotargionia subcorticis Ben-Dov, 1972: 309

As pointed out in its original description this is so far the only African species of *Pseudotargionia* that was collected from a host plant that does not belong to the Leguminosae.

MATERIAL EXAMINED. SOUTH AFRICA. Transvaal, Mara railway station, 16.IV.1972, on *Combretum imberbe* (Combretaceae), HC 4568 (type-series).

Key to the African species of Pseudotargionia

1 The distance between the anal opening and the bases of the median lobes greater than the length of the macroduct between the lobes . . . . . **anareolae**
— The distance between the anal opening and the bases of the median lobes much smaller than the length of the macroduct between the lobes 2
2 With a pair of clavate paraphyses arising basally from the inner angles of the median lobes; dorsal and ventral ducts of the pygidium subequal in size 3
— Without clavate paraphyses at the basal angles of the median lobes; the size of the dorsal ducts of the pygidium larger than the ventral ones 4
3 Dorsal microducts present in submarginal groups on each of the thoracic segments **damara**
— Without dorsal microducts on the submarginal area of the thoracic segments **glandulosa**
4 Inner margins of median lobes divergent, and without plates between them; without a marginal paraphysis between segments V and VI . . . . . **subcorticis**
— Inner margins of median lobes parallel throughout almost their entire length, and with two plates between them; with a marginal paraphysis between segments V and VI **kalaharica**

TABLE 2. Placement of the type specimens.

	PPRI	BM	USNM	MNP	MRT	UCD
Eremiaspis graminis	H-13	2	2	2	2	2
Phaspis lobutata	H- 8	1	1	1	1	1
Pseudotargionia anareolae	H-14	2	2	2	2	2

PPRI=National Collection of Insects, Plant Protection Research Institute, Pretoria. BM=British Museum (Natural History), London. USNM=United States National Museum, Washington. MNP=Muséum National d'Histoire Naturelle, Paris. MRT=Musée Royal de l'Afrique Centrale, Tervuren, Belgium. UCD=Collection of Coccoidea, University of California, Davis. H refers to the Holotype, and the digits to the numbers of paratypes.

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